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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/667,534	09/22/2000	Itaru Seta	32405W056	9872

7590 03/22/2004

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 03/22/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/667,534

Applicant(s)

SETA ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☒ Claim(s) 20,21 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claims 20 and 21 are objected to because of the following informality: the phrase “an own vehicle” in claim 20, line 3 is unclear.

Claim 21 is dependent on claim 20, and is thereby objected to.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11, 16, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 recites the limitation "said first parameter" in lines 5 and 11. There is insufficient antecedent basis for this limitation in the claim.

Claim 17 recites the limitation "said third parameter" in line 11. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 11, the limitations “a second parameter” in line 6 and “said second parameter” in line 19 render the claim indefinite because there is no mention of a first parameter.

Regarding claim 17, the limitations “a third gradient” in line 5, “said third gradient” in line 12, “a fourth gradient” in line 8, and “said fourth gradient” in lines 11 and 12 render the claim indefinite because there is no mention of a first and second gradient.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 8, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Yasui et al. (JP 06-341837).

Regarding claim 1, Yasui et al. (“Yasui”) discloses a stereo imaging means for stereoscopically taking a pair of images (0014-0015), a parallax calculating means 14, 19 for calculating a parallax based on the pair of images, a distance calculating means 101 for calculating a distance to an object based on the parallax and a first parameter for correct the distance, and approximation line calculating means for calculating a plurality of approximation lines extending in the distance direction in parallel with each other based on the images (0014-0015), a vanishing point calculating means 12 for calculating a vanishing point of the images from a point of intersection of the approximation lines, and a parameter correcting means for correcting the first parameter based on the vanishing point (0023-0025).

Regarding claim 2, Yasui discloses a reference object detecting means for detecting a plurality of reference objects extending in the distance direction in parallel with each other from a scenery projected in the images and for identifying a position of the reference objects in an image plane of the images (0010).

Regarding claim 3, Yasui discloses the vanishing point calculating means calculates an approximation line in the image plane for respective reference objects, when a plurality of reference objects are detected by the reference objects detecting means (0014-0015).

Regarding claim 4, Yasui discloses the reference objects are lane markers on a road projected in the images and when left and right lane markers are detected on the road, the vanishing point calculating means calculates an approximation line in the image plane for the respective left and right lane markers (0007).

Regarding claim 5, Yasui discloses the vanishing point calculating means calculates the approximation line based on the left and right lane markers existing within a specified distance range (0017-0020).

Regarding claim 8, Yasui discloses the vanishing point calculating means judges whether or not a lane marker projected in the images is a straight line and in case where it is judged that the lane marker is a straight line, calculates the vanishing point of the images (0017-0019).

Regarding claim 20, the arguments analogous to those presented above for claim 1 are applicable to claim 20. Yasui discloses a vanishing point correcting means for correcting the vanishing point so that the established vanishing point comes close to the vanishing point calculated by the vanishing point calculating means (0037).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 11-15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasui et al. (JP 06-341837).

Regarding claim 11, the arguments analogous to those presented above for claim 1 are applicable to claim 11. Yasui does not appear to expressly state a transforming means for geometrically transforming the pair of images. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the pair of stereo images disclosed by Yasui to include a geometrically transformation because it is well known and routinely implemented in the art to synthesize the geometric relationship between the images in order to recreate the depth dimension.

Regarding claims 12-15 and 18, the arguments analogous to those presented above for claims 2-5 and 8 are applicable to claims 12-15 and 18, respectively.

8. Claims 6, 9, 10, 16, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasui et al. (JP 06-341837) as applied to claims 1, 11, and 20 above, and further in view of Saneyoshi et al. (5,410,346).

Regarding claims 6 and 16, Yasui does not appear to recognize calculating a lane marker model. However, Saneyoshi et al. ("Saneyoshi") teaches that it is known to include a lane marker model expressing the change of a road surface height with respect to distance and

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identify a condition of change of an actual road surface height and correct parameters so that the condition of change of calculated road surface height comes close to the condition of change of the actual road surface height (Col. 3, lines 34-68; Col. 15, lines 9-62). Therefore, it would have been obvious to one of ordinary skill in the art the time of the invention to have modified vanishing point calculating means disclosed by Yasui to include a lane marker model as taught by Saneyoshi because it allows for a precise distance to be obtained by a relative discrepancy of the position in the left and right pictures.

Regarding claims 9, 19, and 21, Yasui does not appear to recognize including a time-versus change of the position of a lane marker projected in the images. However, Saneyoshi teaches that it is known to include a time-versus change of the position of a lane marker (Col. 16, lines 4-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the vanishing point calculating means disclosed by Yasui to include a time-versus change of the position of the lane markers as taught by Saneyoshi because it is well known and allows for change in the road shape due curves or unevenness.

Regarding claim 10, Yasui discloses the parameter as a vanishing point parallax (0010-0011).

9. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasui et al. (JP 06-341837) in view of Saneyoshi et al. (5,410,346) as applied to claims 4 and 14 above, and further in view of Azuma et al. (6,163,337).

Regarding claims 7 and 17, the arguments analogous to those presented above for claim 6 are applicable to claims 7 and 17. Yasui and Saneyoshi do not appear to recognize including the use of gradients. However, Azuma et al. ("Azuma") teaches that it is known to include gradients

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to evaluate the reliability of parallax estimation (Col. 15, lines 17-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the reference object detecting means and lane marker model disclosed by Yasui and Saneyoshi to include the use of gradients as taught by Azuma because it a methodology routinely implemented in the art and evaluates the reliability of parallax estimation across an object's contour line.

Other Prior Arts Cited

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,385,344 to Saneyoshi et al. for adjusting stereo camera;

U.S. Pat. No. 5,825,915 to Michimoto et al. for object detecting apparatus in which the position of a planar object is estimated by using Hough transform;

JP 10-307352 to Kise for adjustment device for stereoscopic camera;

Saneyoshi et al., "3-D Image Recognition System for Drive Assist, IEEE 1993, pages 60-65;

Saneyoshi, "3-D Image Recognition System by Means of Stereoscopy Combined with Ordinary Image Processing, IEEE 1994, pages 13-18;

Weiss et al., "An Error Analysis for Surface Orientation from Vanishing Points, IEEE 1990, pages 1179-1185; and

Bellutta et al., "3D Visual Information from Vanishing Points," IEEE 1989, pages 41-49.

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Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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3/13/04

MEHRDAD DASTOURI
PRIMARY EXAMINER

Mehrdad Dastouri